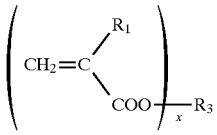
methacrylate, isobornyl acrylate, isobornyl methacrylate, adamantyl acrylate, adamantyl methacrylate, acrylic acid, methacrylic acid, glycerol acrylate, glycerol methacrylate, hydroxyethyl methacrylate, ethoxyethyl methacrylate, cyclohexyl acrylate, cyclohexyl methacrylate, tetradyrofurfuryl acrylate, tetradyrofurfuryl methacrylate, 2-ethoxyethyl acrylate, 2-ethoxyethyl methacrylate, 2-methoxyethyl acrylate, 2-methoxyethyl methacrylate, and the like.

Where the microchannel is fabricated from a crosslinked acrylic polymer, the polymer may be polymerized from one or more of the above monofunctional monomers and one or more bifunctional or multifunctional acrylic monomers that provide for crosslinking. Bi- or multifunctional acrylic monomers that provide for crosslinking will for the most part be described by the formula:



wherein

R_1 is the same as above;

R_3 is a non-aromatic, linear, branched or cyclic saturated alkyl group of from 2 to 10 carbon atoms which may comprise 1 or more heteroatoms, usually not more than 3, usually oxygen; and

x is an integer from 2 to 4.

Specific acrylic monomers of interest that are at least bifunctional include ethylene glycol dimethacrylate, ethylene glycol diacrylate, neopentyl glycol dimethacryalate, neopentyl glycol acrylate, diethoxylated trimethylolpropane triacrylate, and the like.

Of particular interest are microchannels wherein the acrylic portion is a homopolymer polymerized from acrylic or methacrylic esters, wherein the ester substituent contains 1 to 10 carbon atoms, usually 1 to 2 carbon atoms, with polymethylmethacrylate (PMMA) being preferred.

The subject polymers may be obtained commercially, or readily prepared using known methods.

The subject microchannels can be prepared using conventional techniques known in the art, such as thermomolding, extrusion, cast molding and the like.

The subject microchannels find use in a variety of electrophoretic applications, where by "electrophoretic applications" is meant an application where charged entities, e.g molecules, particles and the like, are moved through a medium in response to a voltage gradient being applied across the medium. In using the subject microchannels in electrophoretic applications, the particular method employed will depend at least partially on the nature of the electrophoretic device in which the subject microchannels are employed, as well as the nature of the application to be performed. Generally, the first step will be to fill the inner volume of the microchannel with a suitable electrophoretic medium. Depending on the particular electrophoretic application to be run, electrophoretic media which find use include aqueous and non-aqueous solutions, dispersions and gels, where various buffers, organic and inorganic modifiers, and the like, may be present in the media.

The next step will generally be the introduction of the charged entities to be moved during the electrophoretic application into the medium. Introduction may be achieved using any convenient means, including electrokinetic injection, hydrodynamic injection and the like, where the particular means employed will, for the most part, depend on the configuration of the channel as well as the necessity to introduce a precise volume of sample. For example, with channels in a capillary, means of sample introduction may include electrokinetic injection, hydrodynamic injection, spontaneous fluid displacement and the like, as described in Barron & Blach, supra, at §§ 6.5.2–6.5.4. For MCE applications in which the electrophoretic application is carried out in a microchannel on a substrate, where the microchannel configuration employed comprises a second channel intersecting a first or main channel, the second channel can be filled with sample followed by movement of the volume or plug of sample in the intersection of the second and main channels into the main channel through application of an appropriate electric field. The introduced charged entities may be components of a complex mixture or sample, reagents, and the like, depending on the particular application to be performed.

Following introduction of the to be manipulated charged entities, an electric field or fields will be applied to the medium. Depending on the particular application, the voltage gradient applied to the medium may range anywhere from 10 to 1000 V/cm, usually from 50 to 500 V/cm. Through modulation of the applied electric field or fields, the movement of the charged entities through the medium may be manipulated as desired, depending on the particular application.

For electrophoretic separation applications, the electrophoretic medium introduced into the internal volume of the microchannel will be a separation matrix. Separation media or matrices which find use in electrophoretic separation applications may comprise buffers and other additives, as well as polymeric agents, where both crosslinked and uncrosslinked linear polymers of both synthetic and natural origin, etc may find use. Separation matrices that find particular use in the separation of nucleic acids are reviewed in Barron & Blanch, Separation and Purification Methods (1995) 24:1–105, § 6.8, specifically incorporated herein by reference. Where necessary, the separation matrix may be loaded into the internal volume of the channel under a pressure differential.

For electrophoretic separation applications, after the microchannel is placed in the device and is ready for electrophoresis, the sample to be electrophoresed will be introduced into the microchannel. Of particular interest are sample introduction techniques which provide for the accurate and efficient delivery of a sample volume to the electrophoretic media. The sample volume will be sufficiently small to avoid band broadening during electrophoresis. To avoid significant band broadening, the sample volume will generally range from about 1 picoliter to 1 microliter. Methods which provide for the introduction of precise sample volumes, particularly in CE, include electrokinetic injection, hydrodynamic injection, spontaneous fluid displacement and the like, as described in Barron & Blach, supra, at §§ 6.5.2–6.5.4. For MCE, of particular interest is the use of intersecting channels, where the sample volume or plug at the intersection of a secondary and main channel is moved into the main channel as a result of an applied electric field, as described above.

Following sample introduction, a voltage gradient will be applied to the separation media, causing the various sample components to migrate through the media at rates proportional to their particular charge and/or mass. Any convenient means for applying a voltage gradient across the medium may be employed.

The separated and resolved components are then detected using any convenient detection means. The detection system employed will depend on the particular signal being used as